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ABSTRACT

This guide addresses programming strategies for enhancing the campus climate or environmental support for graduate students in engineering and the sciences, with emphasis on aspects relevant to minority students. It contains an analysis of the graduate school experience, i.e., as it relates to success in graduate programs, with emphasis on minority students. It also includes programmatic ideas for enhancing the campus climate to better serve the needs of a diverse graduate student population. Analysis focuses on: (1) diversity factors within the campus environment; (2) barriers to success for minority graduate students; (3) methods of conducting a campus environmental audit; (4) the role of faculty in the lives of graduate students; and (5) recommendations for enhancing the campus climate. Special emphasis is placed on mentoring as a way to reduce the marginality of beginning graduate students and enhance their progress in graduate programs. Three appendixes contain an environmental audit, a departmental environmental audit checklist for faculty and students, and a graduate student opinion survey. (Contains 15 references.) (MDM)

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Dedication

This manuscript is dedicated to the late Dr. Lyman B. Brooks, one of my mentors. As an educator, he believed that "there are extraordinary powers in ordinary people." As my mentor, he was truly my friend, advisor, coach, and confidant. Because of my association with him, my life has been enriched and my career has been more rewarding.

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PREFACE

"We must not only learn to tolerate our difference,
We must welcome them as the richness and diversity which can lead to true intelligence."

— Albert Einstein

The quality of support provided to members of underrepresented groups by graduate programs is an issue receiving considerable discussion today. Educators, policy makers, and funding sources are concerned with the continuing low participation rate of ethnic minority students in graduate education — particularly at the doctoral level. While a number of institutions have indicated a desire to improve access and choice to their graduate programs, most have experienced only limited success in enrolling more minority graduate students and very little success in retaining them to graduation.

Studies designed to examine participation of underrepresented groups in graduate education (Wells and Adams, 1990) have tended to look only at causal factors external to the institutions. Further, findings from such studies offer little in the way of "best practices" for correcting the problems identified.

This guide is one of a series developed by the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (The GEM Program). It focuses on issues related to the identification, recruitment, retention, and graduation of ethnic minority graduate students in engineering and the natural sciences.

In this guide, readers will find: 1) an analysis of the graduate school experience — i.e., as it relates to success in graduate programs — with emphasis on minority students; and 2) an exploration of programmatic ideas for enhancing the campus climate to better serve the needs of a diverse graduate student population. The analysis section addresses:

- diversity factors within the campus environment;
- barriers to success for minority graduate students;
- methods of conducting a campus environmental audit;
- the role of faculty in the lives of graduate students; and
- recommendations for enhancing the campus climate.

This guide addresses programming strategies for enhancing the campus climate or environmental support for all students rather than dealing specifically with "special" programs for minority students. In so doing, it treats minority students as a subset of the total graduate student population. It draws extensively on the 14 years of experience the author has had in talking with graduate students, faculty, and administrators during visits to the campuses of more than 250 universities.

We hope this guide will stimulate dialogue among various groups on campus and that through these discussions, positive change will be instituted to enhance the climate of support necessary for the success of a diverse graduate student population. At GEM, we continually seek to identify proven strategies and approaches for improving the participation rate and success of underrepresented ethnic minority students in graduate education. Our goal is to serve as a conduit for making model programs known to others. We invite your comments and suggestions for improving this guide and welcome your criticisms and insights. Hearing from you on how this guide was used on your campus — plus, indications of its effectiveness and salience — will be sincerely appreciated.

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INTRODUCTION

"There is growing awareness that a hospitable and nourishing campus climate is necessary to guarantee diversity in higher education institutions. Women and people of color need to work in an environment that promotes their professional growth and development. There is growing recognition of the significant role campus climate plays in the retention of faculty, staff and students. In an era that emphasizes commitment to diversity, it is important to ensure commitment to an equitable and hospitable climate for all members of a campus community."

— Denise Wilbur

Demographers report ethnic minority groups will experience a ten percent gain in their share of the U.S. population within the next ten years. During that same ten year period, 50 percent of the current workforce who have advanced degrees in engineering and science (E/S) will also retire. Largely because of these two projections, the dominate group in the E/S technical workforce — which is white males — will be reduced and there will be increased opportunities for minorities to enter the labor force as faculty members or as research engineers and scientists.

This opportunity for a more diversified and equitable distribution of compensation among the country's citizenry should be good news for everyone; however, these trends must be tempered with the realization that despite years of talking about the democratization of graduate education, annual doctorate survey reports (NSF Annual Doctorate Surveys 1985 to 1992) show very little change over time in the absolute number or percentage share of doctorate degrees awarded to minorities. And because the doctorate is the "key requisite" for employment within the academic ranks of the academy or in the upper tiers of technical research, it is imperative that U.S. colleges and universities do more to expand access and choice to graduate programs for underrepresented groups, while simultaneously reducing the hostility of the campus environment that many of these students encounter and which inhibits their remaining to graduation.

The factors that inhibit the participation and retention of underrepresented minority students in doctoral programs have been examined and documented in several reports (Adams and Conley, 1986; Thomas, 1986; Brown, 1987; Adams, 1988; Wells and Adams, 1990). Among the key contributing factors are:

- The negative portrayal of teaching as a profession where an advanced degree is a requisite for employment as faculty within the academy.
- Industry's concentration of recruiting the most able minority E/S students at the B.S. level during the 1980's, thus eliminating many top minority graduate school candidates from the applicant pool.
- The attractiveness of professional schools — business, law and medicine — which have traditionally provided a better image of career possibilities through more focused marketing strategies.
- The negative growth in funds to support minority graduate students.

- The low retention rates of minority E/S graduate students due to environmental factors — adequate financial resources, mentoring, research advisement, departmental connections, social and academic outlets.

This last one — low retention to graduation due to environmental factors— is the major reason given by minority students (Adams and Conley, 1986) who withdrew from graduate school and by those who completed all the requirements but the dissertation.

In addition to the factors that inhibit the participation and retention of underrepresented minority students in doctoral programs (mentioned above), there are other contributing factors which affect performance and graduation. The latter are mentioned below:

Factors that Effect Graduate School Participation and Performance

- Unfamiliarity with the graduate school process
  - nature of financial aid
  - establishing a course of study
  - graduate school milestones
  - expectations (scholarly attitude, high visibility, full-time work habits)
- Lack of legitimacy within the Academic Department
  - admission without affirmation from departmental faculty
  - financial aid source(s) external to the department
  - suspicion surrounding student's "affirmative action" status
- Poor mentoring and advising
  - limited options to be a protégé
  - few role models
  - lack of adequate faculty references
  - limited opportunities to serve as research assistants — it has been said that "minority graduate students are orphans that no one wishes to adopt."

This guide examines the graduate school environment within the context of the support needed by all graduate students. It then contrasts the support needs of all graduate students with the support needs of minority graduate students. Following that analysis, suggestions on ways to enhance the environment to be more supportive of all graduate students, with emphasis on underrepresented groups, is presented.

The Graduate School Experience

It is important to note that graduate programs are unique and different from undergraduate programs. Engineering and science (E/S) programs clearly delineate this uniqueness with such distinguishing features as:

- Funding (i.e., it's free!) — most E/S graduate students are funded by their departments as teaching assistants or by faculty members as research assistants.
- Collegiality — the nature of E/S graduate work requires close association, cooperation and interaction between individual students and between students and the faculty.
- Independent scholarship — each E/S doctoral student must demonstrate scholarly prowess through class work, research, writings, and presentations.

Expectations

Minority students, like their majority cohorts, enter graduate school with similar anxieties and concerns, (Smith, 1985; Adams, 1988) i.e.:

- fear of the unknown;
- uncertainty about coping abilities;
- anxiety regarding the size and complexity of most large research universities;
- feelings of being isolated and disconnected from other more established graduate students;
- apprehension about the competitive nature of graduate education; and
- misgivings about the racial climate.

From this nebulous position, minority students seek acceptance, support, and encouragement. If received from the graduate school community, most minority students are capable of achieving success and respectability as graduate students, researchers, writers, presenters, and eventually valued colleagues. However, when acceptance, support and encouragement are denied, the graduate school experience can become surreal. As each graduate student advances through a graduate program toward independence as a scholar and researcher, success is enhanced by supportive colleagues. However, graduate students who do not experience that success often find themselves in an abyss where the only way out is to concede failure regardless of one's individual achievement(s).

Enrollment

Minority students, more than any other group of graduate students, are accepted and enrolled in graduate programs as "specially admitted" students. Sixty-nine percent of these students (NSF Doctoral Survey, 1991) are funded by sources external to the university. This "special" admissions status places the student in a precarious position. It marks minority students as outsiders to their departments and peripheral to the collegiality of support that accrues to regularly admitted students, who are funded through internal university sources.

Note: Admission Status — Majority students (almost regardless of academic standing) are admitted to graduate programs though the department without qualification and in "good standing" with the faculty. They are most often admitted directly into a research group with connection to a faculty member. Underrepresented students are mostly admitted by the graduate school or some "special unit" within the university which is peripheral to the department. Such students are disadvantaged by their admission status.

Thus, the admissions and enrollment status assigned to most minority graduate students places them in a position where they are continuously challenged to validate their worthiness and capabilities. Consequently:

- their academic work is almost always suspect;
- their writing ability is more critically judged;
- their productivity is more frequently questioned; and
- their potential for becoming an effective research assistant/associate is seen as "too risky."

The effect is that from the very beginning, minority students are placed in an educational milieu where they experience "situational stress" (see Figure I) — i.e., stress due to environmental factors.

Figure I

Minority Students and Situational Stress

The structure and mix of people in most graduate programs causes minority students to experience *situational stress*

- Being the "only one"
- Being admitted peripheral to the department
- Having a funding source external to the university
- Being a "special admitted student"
- Having professors and other graduate student colleagues hold "low expectations" of you
- Being excluded from the community of scholars (not belonging to a "guild group")

Anxiety brought on by situational stress may cause students to experience problems coping with the day-to-day routines of graduate school. Many students who experience situational stress spend too much of their time and energy trying to maintain some degree of equilibrium between themselves and their environment rather than concentrating on the analytical, conceptual, and philosophical issues germane to their academic career. The effort expended to deal with situational stress would have a greater return on investment for the student and the country if it could be directed toward academic matters.

Situational stress often has a disabling effect on graduate students. This is particularly true for minority graduate students, where feelings of isolation and alienation can dominate emotions. Such feelings disempower and render graduate students ineffective. In some instances they actually become dysfunctional. That is, they fail to exhibit or practice the following behaviors which are associated with successful graduate students:

- associate with the faculty and other graduate students;
- imitate and/or mimic successful classroom and laboratory practices;
- seek and utilize assistance that is generally available to all students;
- accept critical and constructive critiques of their work as the norm; and
- fully participate as a vital member of their departments.

The effects of situational stress on graduate students often results in the students experiencing decreased self-esteem, drive and motivation, as well as, increased feelings of defeatism and fears of failure. The net effect of these anxieties becomes a form of paralysis to performance.

The Graduate School Environment

Reasons for building an environment that welcomes and celebrates diversity:

- It's NECESSARY!
- It's JUST!
- It's INEVITABLE!

Efforts to address issues that affect the success of underrepresented minority groups in graduate programs have had a tendency to focus exclusively on what I label "student driven factors" — i.e., 1) test scores, 2) statement of purpose, 3) ability to bring outside fellowship support, 4) academic credentials, etc. These are indeed critical variables and deserve attention; however, by focusing on only these variables, the assumption is that "student driven factors" are the only factors that affect a graduate student's performance. Consequently, the problem is perceived as student oriented and the conclusion is drawn that if the institution recruits and selects a different caliber student — one who more clearly fits the profile of the "typical student" — future success would be assured.

Such an assumption fails to address another very important element that should be factored into the equation — i.e., the graduate school environment. The graduate school environment is defined as:

> the academic, social and cultural arena in which students pursue the advanced degree (ASEE Engineering Deans Council Task Force Report, 1989).
>
> It is the sum total of the daily environment and central to the "comfort factor" that minority students, faculty, staff, and administrations experiences on campus (Minorities on Campus, 1990).

Within the graduate school environment, graduate education is shaped and delivered by the various departments. Each department is composed of small clusters of faculty, post-doctoral students, researchers, and other graduate students. These "clusters" are further subdivided into units that are funded primarily through grants and contracts which are under the control of individual departmental faculty, who serve as principle investigators. Richardson, in his treatise on "Institutional Climate and Minority Achievement" (1989), refers to these clusters as "guild-like" groups.

Graduate students entering a department as an outsider to a "cluster" must overcome formidable barriers to become part of a graduate "guild." And minority students, who usually are admitted as outsiders, must overcome a number of additional barriers — e.g.,

1. the perception of being a special admit/"non-legitimate" student;
2. the absence of faculty who are willing to consciously develop a mentoring/advisement relationship with minority students;
3. external or non-cluster group funding — most minority students are supported by funds external to to university;*
4. access to study space and acceptance into a laboratory;
5. unfamiliarity with the graduate school process; and
6. the absence of supportive departmental colleagues.

***This author has continuously advocated that minority students need to be funded through departmental RA/TA opportunities (RA-research assistantship; TA-teaching assistantship.) This funding mode foster closer departmental ties and thus offering greater opportunities for minority students to engage in departmental activities, i.e., seminars, committee work, study/research groups, professional societies, social gatherings, etc., (Adams, 1988, Wells and Adams, 1990).**

These and other barriers encountered by minority students tend to be associated with the limited contact that graduate level faculty have experienced with underrepresented minority students. As a result, the faculty tend to be uncomfortable in personal one-on-one relationships. This uneasiness is largely due to: 1) the culturally restricted and misunderstood informational needs of minority doctoral students; 2) the perceived risk in taking on a minority protégé that is based on limited respect for their academic abilities; and 3) a history of strained relationships, based on cultural rather than academic differences, between minority students and the "guild" units within academic departments. These barriers must be removed if minority students are to succeed in their graduate studies. The critical areas of personal, social and educational development are frequently neglected due to hostile campus climates and feelings of isolation. This causes far too many minority students to emerge from the doctoral experience deprived and impaired in relation to their potential. As a consequence, these students never develop the scholarship prowess and hands-on research capabilities essential to a career of teaching and research. In the process, the academic community loses an opportunity to grow and benefit from the cybernetic growth of knowledge influenced by cultural understanding.

Academicians responsible for graduate education need to be more knowledgeable and understanding of the relationship between graduate students and the campus environment, and the influence that the graduate school climate has on a doctoral student's success. Figure II presents the "indicators of environmental support" identified by Dr. Jacqueline Looney, assistant dean for Graduate Recruitment at Duke University's Graduate School.

Figure II

Indicators of Environmental Support

- Students, faculty, and administrators of color.
- Active graduate school and departmental support groups.
- Multidisciplinary colloquiums where students share scholarly interest with other students and faculty.
- Research opportunities for students with fellowships and scholarships.
- Access to graduate school faculty and administrative staff.
- Comprehensive counseling service with a professional staff equipped to serve a diverse student population.
- Travel grants for conference participation and research.
- Graduate school newsletters.
- Availability of emergency loans for graduate students.

Assessing the Graduate School Environment

Focusing on diversity issues within the context of the campus climate or environment is important because students from different cultures, ethnicities, genders and generations tend to function from their own unique prospective. These varying perspectives influence the way individuals communicate, interact, and interpret events that occur within their local setting. For example, the issue of strip mining at a midwestern university may be interpreted significantly different by a young American Indian female graduate student from the southwest majoring in civil engineering and her middle age Caucasian male civil engineering professor of Polish descent from the northeast. Consequently, the very nature of graduate education demands that each campus provide an academic setting conducive to all students realizing their full potential. However, before the graduate school community can judge how well it is responding to the needs of students, it must have a clear understanding of present environmental conditions. One method for evaluating the status of the campus climate, is a campus environmental audit (campus audit).

Why a campus audit? A campus audit can provide important information that will benefit an institution in at least two ways. First, the findings can be used as an incentive for change; and secondly, they can also provide feedback to indicate early warning signs of problems. Through the audit, a systematic and comprehensive profile of the environment can be compiled. This organized body of knowledge will constitute a basis from which to focus future program planning and policy decisions. Principles that need to be incorporated into the plans for an audit are:

- comprehensive assessment goals;
- research tools to guide implementation strategies;
- broad inclusion of members from all segments of the campus community; and
- top-down formulation of policy with bottom-up assessment.

To insure that the audit findings provide meaningful data on present conditions, critical elements of the campus climate should be examined. These should include, but not necessarily be limited to, the following:

- needs and concerns of female and minority students;
- availability of faculty to students;
- a codification or measure of institutional structure/culture;
- opportunities for departmental faculty and student input;
- an assessment of the availability and accessibility of clubs, societies, programs, etc.;
- an assessment of cross cultural opportunities and implementation strategies in regular campus programming;
- staffing policies for recruiting, hiring, developing and promoting personnel; and
- the commitment to campus diversity by top administration.

The involvement of the above referenced principals and measures of campus climate will facilitate the establishment of a basic date set of information and benchmark. Following the compilation and systematic dissemination of this information, the community will have a common frame or point of reference from which to move forward in its efforts to improve the existing situation.

Sample worksheets for assessing the campus climate are included in the appendix. Appendix A, offers a series of questions labeled "Checking The Vital Signs: The Environmental Audit." These questions are broad based and should be used to establish a framework to guide assessing current practices and procedures. Appendix B is the "Departmental Environmental Audit Checklist for Faculty and Students." It is offered as an instrument for uses to have both faculty and students focus and evaluate specific aspects of a campus environment from a departmental perspective. It provides for an assessment of 1) Admission/Financial Aid, 2) Mentoring/Advising, 3) Departmental Information, 4) Supportive Services, 5) the Campus Environment, and 6) General Comments. Finally, Appendix C is the "Graduate Student Opinion Survey" and is an instrument that can be used with all graduate students to profile perceptions that they have of practices and policies across the total campus.

In collecting and compiling this information, it should be kept in mind that the objectives of the audit are to:

1) ***Investigate*** how well the educational and personal needs of graduate students are being met.
2) ***Inform*** the campus community of present environmental climate conditions.
3) ***Implement*** nurturing programs supportive of a diverse graduate student populous.
4) ***Influence*** the campus community, especially the faculty, to use "best practice" strategies in efforts to improve the environment of support for all graduate students.

Commitment from the Top: The President's/Chancellor's Role

While most university chief executive officers (i.e., chancellors and presidents) publicly commit their institutions to the concept of equal access and choice to graduate education, the data on degrees awarded to minority group students (NSF Doctoral Survey Reports, 1985-1992) indicates that the goal of greater participation by these groups in graduate programs is unfulfilled. Based on these NSF reports, if presidents were graded on their university's success in democratizing graduate education, the grade would be an "F" for failing to achieve favorable results.

For some presidents, this failing grade would be attributable to the absence of a campus plan or goal to reach some measure of cultural diversity or ethnic equity. Today — i.e., 1993 — one indication of good management by the university president is a genuine and bold commitment to the democratization of all facets of the campus. Such advocacy by the chief executive officer insures that the campus environment is open, accessible, and supportive of all who are "eligible" to participate and can benefit from the experience.

The Challenge to Presidents

The challenge to the chief executive officers of our colleges and universities — as they seek to extend equity to a diverse population of students, faculty, and staff — is "how to" create and maintain a campus milieu that is supportive of diversity. To accomplish this, they must exhibit and practice model behavior on matters of diversity. This means not only "talking the talk" of diversity, but "walking the walk" of diversity.

Essential to the success of university chancellors and presidents in enhancing the campus climates are subtle nuances associated with cultural and ethnic diversity. For example, success in recruiting underrepresented groups is not a sufficient indicator of success — **retention to graduation should be the "bottom line."** A similar nuance involves accepting as fact, goals on paper that can be explained away without actualization — these are merely "hollow echoes." Diversity should not be placed peripheral to other important programmatic issues. Issues that are valued on campus are given top priority — e.g., 1) each is an item in the annual university plan; 2) each is given budget lines when needed; 3) each is placed under some administrator with authority to act; and 4) each is evaluated for results.

To clearly establish the president's position *vis-a-vis* creating a supportive, enabling and caring environment; one that welcomes and affirms diversity, campus CEO's need to:

1. Establish measurable goals with detail parameters - i.e. objectives, timetables, accountability and outcomes;
2. Make diversity issues valued university action goals;
3. Give oversight responsibility for ensuring compliance to the vice presidents and deans;
4. Make sure that all constituent groups are included in planning and implementing the campus plan; and
5. Provide opportunity for training administrative and support staff.

In other words, the community needs to take ownership of the issue!

Should the President Bring in a Consultant?

Often in discussions with presidents, I am asked about the value of bringing in an outside consultant to assist the campus community on issues of diversity; particularly as they apply to underrepresented groups. My response is that the decision should be based on the campus structure and culture. Where the campus is open and already responsive, this might not be necessary. However, if their is resistance to change and little communication, a consultant could be a very good neutral outside facilitator to assist the administration. By using an outside consultant, faculty, staff and students might be more open and honest and feel more secure in discussing campus issues. Should the decision be made to bring in an outside consultant, the president must make sure that the person is neutral (does not have an "ax to grind" or owe allegiance to anyone on campus) and has the credentials, expertise and track record for providing the assistance needed on that campus. Figure III outlines key elements for focusing the campus strategic plan on diversity.

Figure III

Key Elements for Enhancing the Graduate School Environment

- Create diversity team
- Improve campus communications
- Employ lessons learned
- Create atmosphere of commitment
- Stimulate dialogue
- Improve access to information
- Make mentoring minority students okay
- Improve access to laboratory space and equipment
- Institute formal review
- Educate support staff
- Recognize important contributors
- Hire and develop faculty/staff of diverse backgrounds

The Department

How can each academic department respond to the needs and expectations of a diverse graduate student community? The starting point is to realize that all graduate students must be encouraged and assisted to view their department as their academic home. To make this happen, each department should:

- Welcome new graduate students through sponsored orientation sessions and/or departmental gatherings.
- Provide students with descriptive, written information on departmental
  - policies and procedures;
  - faculty members — names, location, and specialty area (teaching and research); and
  - program offerings; etc.
- Sensitize (through training) support staff to departmental goals for creating an environment that welcomes and affirms each new graduate student.

In addition, the academic climate for each graduate department can be further enhanced through the creation of student focused activities:

- scheduled seminars
- journal review sessions
- prep-sessions
- colloquiums
- research review groups
- visiting professors

Beyond implementing the above suggested activities for welcoming all students, the department may also need to employ additional strategies to assist minority students with becoming connected to the department's academic community. Here we recommend the following:

- Target department-wide minority recruitment activities to build a critical mass of minority students — the fact that there is a very small minority population on campus exacerbates the problem of isolation and lessens the chance for building social/personal/professional outlets.
- Provide opportunities for regular academic and social contact between faculty and students through greater emphasis on involving minority students in departmental activities — seminars, committees, study/project groups, professional societies, etc.
- Provide teaching and research training opportunities through well-defined, well-mentored teaching and research assistantship (RA/TA) opportunities. These types of connections foster closer ties with departmental faculty and other graduate students.
- Encourage the scholarly output of minority graduate students by providing opportunities for them to present and publish their work.

The Faculty's Role in the Life of Graduate Students

As graduate programs become more diverse through expanded access and choice to underrepresented groups, insuring equity of opportunity will remain an elusive challenge. And no where will this challenge be tested more than among the ranks of the graduate level faculty, who must extend their roles of advising, mentoring, nurturing, and developing the scholarship and research prowess of underrepresented students who have mostly been left out of the process.

The Faculty: Departmental "Gate-Keepers"

> Despite all the tinkering that has occurred at the administrative level, the faculty remains the "gate-keepers" to graduate education.

Many programs implemented by colleges and universities to address issues of diversity within graduate education were flawed in their design — i.e., they failed to address the key role of faculty as "gate-keepers" for their departments. Not only are faculty the main players in establishing departmental policies and procedures, they also make most of the decisions regarding allocation and distribution of departmental resources. As departmental "gate-keepers," faculty play three important roles which determine the character and modus operandi of the department:

1) they establish and approve departmental polices and procedures;
2) they design and deliver courses taught within the department;
3) they developed procedures for monitoring and evaluating student progress.

Actions for the Faculty

The faculty can assist with the academic and professional development of graduate students by working with individual students to help them develop a "vision" of becoming scholars/researchers. This is accomplished as faculty:

- Help students make the transition to the independent, yet, collegiate nature of graduate education.
- Assist students with mastery of laboratory/research protocol.
- Provide guidance and advice for program planning.
- Facilitate collaboration building with other graduate students.
- Help students identify and select a research group.
- Direct students to and help them secure financial and other needed resources/equipment.
- Work to insure that all students are treated fairly, respectfully and with the necessary support that says we care that you are here and affirm your academic/professional goals.

Reducing the Marginality of Beginning Graduate Students

All students need to develop an academic mindset early in their tenure. This will provide them with the wherewithal to negotiate the graduate school process. Critical attributes that need to be a part of this academic mindset include the following strategies:

- belonging
- protege function
- scholarship
- collegiate association
- research/scientific practices
- survival

Some students will enter graduate school with a high degree of knowledge regarding graduate education and will have little trouble making the transition. For others, those with limited prior knowledge, their transition might be very stressful. And since the campus "information loop" might be restricted or closed for some students, it is imperative that the university have in place a well-developed and well-timed orientation program for all new graduate students.

New student orientation is most effective when it is conducted at the departmental level. For those departments seeking to connect students early in their graduate study tenure and thus, reduce marginalization, we recommend these strategies:

- move early to integrate underrepresented graduate students into the department and assist them to build a sense of belonging, i.e.:
  - appoint departmental ambassadors from among current graduate students.
  - conduct departmental orientation sessions for all new graduate students.
  - implement written guidelines for departmental staff functions regarding acclimation of new graduate students.
- encourage and reward the advising and nurturing of minority and women students — make mentoring those students okay;
- facilitate the match of underrepresented students with faculty mentors — don't leave forming the mentoring alliance to chance; and
- treat all students as legitimate members of the graduate school community by respecting and nurturing their academic and scholarly attributes and potential.

Some additional activities that have prove effect for enhancing the departmental climate include "visiting scholar programs" and "attitudinal bias seminars." Visiting scholar programs involve making a special effort to invite minority faculty and researchers from peer institutions, industry and government to campus, as a regular part of the departmental lecture/seminar series. Through such visits, minority and majority students (as well as majority faculty) will be exposed to minority professionals who contradict the preconceived stereotypical characterization of minorities. The other strategy — attitudinal bias seminars — constitute open forums for faculty to deal with their own fears, attitudes and assumptions about minority students (e.g., they are all "special admits" and thus less qualified than other students; the assumption that minority students have difficulty conceptualizing and writing; that minority students will be funded by some outside agencies and thus, there is no need to use departmental resources on them, etc.).

Mentoring*: A Defining Element of Supportive Environment

***For a detail discussion of mentoring and doctoral students see *Mentoring: An Essential Factor in the Doctoral Process for Minority Students* by Howard G. Adams (1992).**

What is Mentoring?

Mentoring, in the context of graduate education and for the purpose of this guide, is defined as "a process by which persons of superior rank, special achievements, and prestige [mentor], instruct, counsel, guide, and facilitate the intellectual and/or career development of persons identified as protégés" (Blackwell, 1989, p.9).

Mentor: teacher or advisor; one who leads through guidance (Adams, 1992, p.1).

Protégé: one who is under the special care of a usually older person of superior position and experience to be guided in the development of a talent or career (Funk & Wagnalls Encyclopedic College Dictionary).

The Mentor and Graduate Students

The literature on graduate education identifies effective mentoring as an essential factor for determining graduate student success in doctoral programs (Katz and Hartnett, 1976; Adams, 1992). Indeed, in follow-up surveys of GEM doctoral alumni (N=50), only financial aid is rated more important than effective mentoring (a description of GEM is given on the inside back cover of this publication). The general conscience of GEM doctoral alumni is articulated best by a 1989 M.I.T. Ph.D. recipient who states that "In the absence of effective mentoring, even the most able graduate student, regardless of ethnicity or funding status, will experience added stress negotiating a doctoral program."

Minority students, in graduate education settings, often find themselves as an isolated group within the academy. This places them peripheral to the scholarly activities so necessary for the successful completion of an advanced degree. Such isolation experiences can result in poor acclimatization to the department and, thus, deprive the student of vital resources and support (financial aid, equipment, supportive colleagues, contacts, faculty nurturing and advisement). Effective mentoring should link minority students with faculty, administrators and other graduate students to provide the nurturing support necessary to affirm these student's place in the academy.

What Do Mentors Do?

From the student development model (Adams, 1992), mentoring integrates the student into the department and fosters:

- Building self-esteem
- Affirmation of potential
- Orientation to department
- Access to information
- Connecting to resources
- Empowerment

From an engineering or science prospective, the mentoring alliance for graduate research students provides apprenticeship opportunities. Such mentor/protégé relationships establish a system where the mentor becomes:

- Coach
- Sponsor
- Advisor
- Confidant
- Teacher
- "Door opener"

Of these, the most important function is that of being a "trusted coach who guides the student through the maze of a graduate program" (Adams, 1992, p.1).

The mentor plays out the various roles in a number of different ways, i.e., by serving as:

- a source of information regarding departmental programs, politics, protocol, policies and procedures, etc.
- an advisor who guides the protege through the intricacies of program planning, course selection, preparing to take and pass milestone examinations, identifying and selecting a research area, writing and presenting the dissertation;
- an advocate for the protege as progress is made toward completion of the doctorate;
- a confidant and friend who lends support to bolster the protégé's self-confidence by modeling good scholarship/research practices;
- a "sounding board" who gives constructive and critical review of protégé's work, free of judgmental bias;
- a "door opener" to run interference for the protégé in gaining access to departmental resources, space, equipment, information and;
- a sponsor and promoter of the protégé into the profession; etc.

Characteristics Common to a Good Mentor

A good mentor is one who:

- exhibits high standards of scholarship and integrity;
- is knowledgeable of institutional/departmental policies and practices;
- offers support and encouragement;
- is comfortable in the many roles of a professor and enjoys mentoring and nurturing students;
- is in "tune" to the changing times and is willing to change and adapt;
- has time to devote to the protégé and is willing to be available; and
- is honest about the protégé's progress and shortcomings.

The Benefits of Good Mentoring Practices

Good mentoring is accomplished in the doctoral process through the mentoring alliance where the protégé serves as an apprentice under the tutelage of the mentor (major advisor).

Good mentoring practices empowers graduate students by coaching and assisting each student to:

- master those competencies necessary to successfully meet the milestone of a doctoral program;
- understand and adapt to the academic, social, political, and cultural mores of the department — standards, norms, values, history, programs, people, etc.;
- become a legitimate and valued member of the department;
- develop scholarship and research prowess through emulation of "time honored" effective practices; and
- develop the following competencies that new doctoral recipients are expected to possess, i.e.:
  - Organizational skills
  - Presentation skills
  - Coping skills
  - Time management skills
  - Transition skills
  - Procurement skills

Finally, good mentoring practices provide gamesmanship techniques that address issues in these three broad areas:

- *Administrative* — grant writing, budget management, equipment procurement, etc.
- *Technical* — course design, presentations, preparation of exams, publishing papers, launching career, etc.
- *Social* — departmental politics, networking, etc.

The Mentoring Alliance

Minority graduate students report a lack of support in the form of nurturing from the campus community. In particular, they cite as a problem the difficulty they encounter in forming meaningful and effective mentoring relationships with the graduate level faculty (Wells and Adams, 1990).

Blackwell (1989) lists the mentoring alliance as an essential factor for the success of black graduate students. Indeed, most investigators on the subject hold that if graduate programs wish to foster minority graduate students' success, they must give primary attention to those efforts that concern forming effective mentoring alliances between faculty (as mentors) and students (as protégés).

In establishing a formalized mentoring program, two important caveats must be kept in mind:

> Mentoring should not be viewed as a substitute for other essential elements of effective academic support programs such as financial aid, study space and adequate equipment, supportive colleagues, access to department, resources, etc.
>
> Mentoring programs will not release the rest of the campus community from its responsibility of working to provide a supportive environment that addresses the "3 Rs":
>
> Recruitment • Retention • Reaffirmation

To facilitate forming effective mentoring alliances between students and the graduate level faculty, it is important to:

- involve all students in departmental activities;
- have all graduate students meet the graduate faculty early in their matriculation; and
- make departmental faculty research areas, writing and publications readily available to new students.

Enhancing the Environment of Support

Discussions, concerning enhancing the environment of support to meet the educational, personal and social needs of a diverse graduate student population are usually greeted with little enthusiasm from graduate level faculty. This is especially true of E/S graduate faculty who are accustomed to working with a highly selected group of graduate students — those admitted directly into the individual faculty member's laboratory research group ("guild unit"). From this prospective, the faculty's typical response to issues of diversity is "here they come again asking for special consideration." This is followed by the pronouncement that "students who require special attention cannot do E/S work and are therefore not of the caliber that warrants consideration for graduate studies."

This author has talked with numerous faculty over the years regarding such attitudes and has challenged them with this simple, but true, statement of fact "there is nothing special about adequate and sustained graduate financial aid; supportive colleagues with whom to relate and work; sound, unbiased advising; and sensitive, yet personalized mentoring" (see Figure IV - Necessities for Success in Graduate School). Further, I point out that because many first year graduate students are unfamiliar with the graduate school process — i.e., handling departmental polities, planning one's academic program, identifying a research group, becoming acclimated to the campus cultural, etc. — their first year as a graduate student is a time of high anxiety, regardless of their ethnicity. This state of anxiety is especially acute for minority students whose feelings of disconnection exacerbates the situation.

Figure IV

"Necessities" For Success in Graduate School

- Funding to allow full-time effort on graduate work.
- A mentor who expects you to perform, without excuses, and who provides guidance and counseling as needed.
- Supportive colleagues who provide feedback and make you feel like you're a member of the group.
- A department that claims you and facilitates your getting through the process.

The campus community is an assemblage of persons from different genders, cultures, ethnicities, and backgrounds. Consequently, approaches to build an inclusive, supportive environment must involve all facets of the community plus the three "Cs" of Commitment, Cooperation and Communication which are requisites for building a supportive environment (Figure V).

Figure V

Requirements for Building a Supportive Environment

Commitment — A declaration from the top to democratize the campus and ensure that it is open, accessible, and supportive.

Cooperation — willingness among constituent groups to work together in a spirit of collegiality.

Communication — open dialogue to share information and concern across as well as among groups to build a community of trust and respect.

To create a supportive, enabling, and caring environment for graduate student requires:

- creating a campus-wide mindset to value diversity;
- removal of internal barriers to programs, resources, and people;
- inclusion rather than exclusion of all constituent groups; and
- commitment to, and support for, building a pluralistic campus community.

To implement these strategies should not require the outlay of a large amount of additional funds. It will require expertise to plan, implement, and monitor new programming activities. In addition, it will require 1) directed commitment from top administration; 2) faculty as well as graduate student involvement; 3) logical, measurable implementation steps; and 4) a timetable for evaluating results.

Some extra resources will be necessary. But considering the cost of not doing anything, additional resources, focused well, could be well spent. Further, where campuses have developed new strategies to enhance the campus environment (MIT, GA Tech, Texas A&M, Berkeley, University of Michigan, and Stanford) monies have been saved through 1) reduced time to degree; 2) reduction in ABD's; 3) a more cohesive and productive graduate student populous; and 4) increased enrollment and graduation of underrepresented minority students.

Ending/Concluding Notes

Graduate and professional schools, through credentialing and certification, serve as the "springboard" to positions of leadership, power and authority. Indeed, this author continuously reminds minority students that "the leadership of the country is primarily drawn from the ranks of those who are holders of advanced degrees."

Currently, because of a number of factors, minority group members lose ground, in terms of absolute number and percentage share of degrees, at every stage in the degree continuum from bachelor to the doctorate.

Initiatives implemented to increase participation have done little to improve minority access, and choice to graduate programs. Further, for those who enroll, the campus climate serves as a formidable barrier to success. Without question, most efforts made by graduate schools to democratize graduate education were based on "good intention to do the right thing." However, after much discussion and lots of promises, minority students continue to be vastly underrepresented in graduate education.

In this publication we make the case that because the graduate school experience is indeed different for different students, efforts to address participation of ethnic minorities must, based on the nature of the problem, be different. Different, yes; special, no! There is nothing special about good practices of mentoring, nurturing and empowering students.

Appendices

APPENDIX A

CHECKING THE VITAL SIGNS: THE ENVIRONMENTAL AUDIT

What are the conditions of the campus environment? Is the campus environment equally supportive of all students? These are questions that every college/university community needs to ask of itself periodically. Answers to these important questions can be gotten by conducting an institutional environmental audit. Listed are key questions for framing the audit (a sample audit survey form is provided in Appendix B).

1. Are program materials and information made available to graduate students (a) up-to-date; (b) accurate, and (c) relevant to their understanding "how-to" negotiate the graduate school process?

2. How does the proportion of underrepresented students admitted on-outside funds (external to the university) compare with the proportion admitted on inside university funds (internal funds)?

3. What effort is made to insure that specially admitted/funded students are connected to their departments to the same degree that regularly admitted students are, i.e. (a) assigned to study/research space; (b) assisting in finding a research group; (c) have access to other established graduate and post-doctoral students; (d) have accessibility to the faculty, etc.?

4. Do departments provide orientation and pre-registration counseling to facilitate (a) course selection; (b) program planning; (c) introduction to department, faculty and other graduate students, and (d) learning about departmental programs, services, facilities, policies and procedures?

5. What assistance is provided new graduate students to identify and select a major advisor/mentor?

6. Are departmental support staff adequately trained to be sensitive to the needs of a diverse graduate student populous?

7. Are coordinators of departmental graduate programs committed to access and choices to those graduate programs they oversee?

8. What responsibility does the president/chancellor place on each dean to manage and foster the institution's commitment to diversity?

9. What consideration is given for support to campus diversity in annual salary reviews and promotions for faculty, administrators, and staff?

10. Are campus-wide guidelines governing campus diversity reviewed and reaffirmed annually?

11. Are exit interviews conducted with graduate students who withdraw prior to completion of the degree?

APPENDIX B

Departmental Environmental Audit Checklist for Faculty and Students

Rate departmental services available to graduate students by placing a letter from the scale below in the appropriate box.

SCALE: E = Excellent, S = Satisfactory, and U = Unsatisfactory

Admission/Financial Aid	**E**	**S**	**U**
Request for admission/financial aid information is handled promptly			
Systematic program is utilized to identify and recruit graduate students			
Underrepresented students are target in recruitment activities			
Admission and financial aid notification is sent simultaneously			
Minority students are admitted through regular admission procedures			
Minority students are regularly considered for RA/TA assistantships			
COMMENTS:			

Mentoring/Advising	**E**	**S**	**U**
Adequate and appropriate advising is available to all graduate students			
Advising involves course selection as well as program planning			
Opportunity to rotate among faculty to gain knowledge of research areas			
Flexibility for changing advisor is adequate			
Assistance is provided to facilitate the selection of a mentor			
Senior level faculty are available and accessible			
COMMENTS:			

Departmental Information	E	S	U
Departmental information is accurate and up-to-date			
Effective outlets exist for dispensing departmental information			
Policies and procedures for negotiating the degree programs are well defined			
Departmental materials display diversity			
COMMENTS:			

Supportive Services	E	S	U
Library/Laboratory hours accommodate diverse students			
Study/research space is efficient and adequate			
Diverse students are encouraged to function as regular departmental members			
Specially trained staff is available to work with diverse students			
Tutoring/expert technical assistance is available to new graduate students			
COMMENTS:			

Campus Environment	E	S	U
Concerns of underrepresented students are a regular part of the departmental agenda			
Minority professional/eminent scholars are included in campus lecture/seminar series			
Staff/faculty development workshops are conducted to train university personnel how to serve the needs of diverse students			
Effort is made to have underrepresented groups included in searches			
Campus-wide acknowledgement for mentoring/nurturing underrepresented student encourages involvement by senior faculty			
COMMENTS:			

General Comments	E	S	U
How would you evaluate the departmental faculty's attitude for serving diverse students?			
How would you evaluate the departmental staff's preparedness for serving diverse students?			
How would you rate the overall departmental climate for supporting and nurturing graduate students?			
How committed is the university to providing consistent excellent support to underrepresented students, while simultaneously creating a climate that reaffirms the development of these student's attributes and potential?			
COMMENTS:			

A hospitable and nurturing campus climate is necessary for the total development and success of all graduate students. Please provide any additional comments on you campus' commitment to enhancing the campus climate for diverse students.

GRADUATE STUDENT OPINION SURVEY

Campus Climate Assessment

Graduate students, we need your help to assist in assessing the campus climate of your university. Please fill out this questionnaire by circling the choice that best represents your opinion or experience for each question. Keep in mind that your responses to the questions are anonymous.

1. Overall, how would you rate the climate of support your institution provides graduate students?

Excellent *Good* *Fair* *Poor* *Don't Know*

2. How satisfied are you with each of these key elements of your campus community and how important is each to you?

	Very Satisfied	Somewhat Satisfied	Not At All Satisfied	Don't Know	Very Important	Somewhat Important	Not Important
Feedback/critique of performance	1	2	3	4	1	2	3
Housing for graduate students	1	2	3	4	1	2	3
Admission process	1	2	3	4	1	2	3
Graduate student financial aid	1	2	3	4	1	2	3
Faculty advising/mentoring	1	2	3	4	1	2	3
Faculty accessibility	1	2	3	4	1	2	3
Library/research facilities	1	2	3	4	1	2	3
Departmental response to student needs	1	2	3	4	1	2	3
Institutional support for diversity issues	1	2	3	4	1	2	3
Diversity of campus faculty and staff	1	2	3	4	1	2	3
Diversity of invited speakers	1	2	3	4	1	2	3
Seminar/lecture series	1	2	3	4	1	2	3
Opportunities for interaction with other graduate students	1	2	3	4	1	2	3
Racial tolerance on campus	1	2	3	4	1	2	3
Minority student integration into department	1	2	3	4	1	2	3
Departmental orientation for new graduate students	1	2	3	4	1	2	3
Study space/graduate student offices	1	2	3	4	1	2	3

3. How satisfied are you with the supports that your departmental faculty has provided for developing and refining these competencies and how important is each to you?

	Very Satisfied	Somewhat Satisfied	Not At All Satisfied	Don't Know	Very Important	Somewhat Important	Not Important
Problem solving	1	2	3	4	1	2	3
Conducting research	1	2	3	4	1	2	3
Acclimation to laboratory routine	1	2	3	4	1	2	3
Using computers/software	1	2	3	4	1	2	3
Library research	1	2	3	4	1	2	3
Writing research grants	1	2	3	4	1	2	3
Preparing/delivering presentations	1	2	3	4	1	2	3
Building departmental relationships	1	2	3	4	1	2	3
Meeting key contacts external to the department	1	2	3	4	1	2	3
Teaching methodology	1	2	3	4	1	2	3
Counseling and advising students	1	2	3	4	1	2	3
Developing curricula	1	2	3	4	1	2	3

4. In the past 12 months, have you done any of the following? If yes, how would you rate the helpfulness of the person(s) who handled your question or problem?

			Very Helpful	Somewhat Helpful	Not At All Helpful
Contacted the department for assistance	Yes	No	1	2	3
Sought advice from a faculty member	Yes	No	1	2	3
Attempted to become a research assistant (RA)	Yes	No	1	2	3
Attempted to become a teaching assistant (TA)	Yes	No	1	2	3
Asked a faculty member to serve as major advisor	Yes	No	1	2	3
Sought support to attend professional meeting	Yes	No	1	2	3
Asked to co-author with a faculty member	Yes	No	1	2	3

5. In the past 12 months, have you done any of the following? If yes, how would you rate your overall experience?

			Excellent	Good	Fair	Poor
Attended a department-sponsored seminar, meeting, colloquy	Yes	No	1	2	3	4
Participated in a graduate student-sponsored event	Yes	No	1	2	3	4
Held advising session with a faculty member	Yes	No	1	2	3	4
Served as a TA/RA	Yes	No	1	2	3	4
Visited the graduate school office	Yes	No	1	2	3	4
Participated in campus/departmental meeting	Yes	No	1	2	3	4
Attended a departmental social event	Yes	No	1	2	3	4

6. In the past 12 months, have you experienced any situation where you were treated unfairly or with disrespect because of your ethnicity or gender? *Yes* *No*

   Did you report the incident to anyone? *Yes* *No*

   If yes, how would you rate the response?
   Excellent *Good* *Fair* *Poor* *Don't Know*

7. Rank order the top three issues which you feel are the most important problems for campus officials to address first. Put a "1" next to the issue you feel is most important, a "2" next to the second most important issues, etc.

	Rank		Rank
Graduate student housing	____	Campus racial tolerance	____
Equitable allocation of RA/TA	____	Graduate student orientation	____
Faculty mentoring	____	Research opportunities	____
Admission procedures	____	Department support for students	____
Seminar/lecture series	____	Availability of study space	____
Departmental advising	____	Financial aid	____
Availability of child care	____	Faculty availability	____
		Faculty/student social events	____

8. Is graduate student housing available on your campus? *Yes* *No*

9. Do you live in graduate student housing? *Yes* *No*

10. How satisfied are you with the housing available to graduate students?
    ____ *Very satisfied* ____ *Not at all satisfied*
    ____ *Somewhat satisfied* ____ *No opportunity to evaluate*

11. Your gender: *Female* *Male*

12. Your race/ethnicity: *American Indian* *Hispanic*
    Asian *White*
    Black American *Other*_____

13. Your age: *21–27* *28–34* *35–45* *Over 45*

14. Is there any information you would add or delete from this survey? *Yes* *No*
    If so, what?_____
    _____
    _____
    _____

_____

15. In the space below, please make any comment you have regarding the campus climate at your university.

16. If you had the opportunity to make the choice again, all things being equal, would you choose your present university ***Yes*** ***No*** ***Undecided***
If no, why?

17. If you could make any changes at your university to enhance the campus climate of support for graduate students, what one change would you make?

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This is GEM

GEM is an acronym used to identify the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc., a tax-exempt, non-profit corporation headquartered at the University of Notre Dame in Notre Dame, Indiana. Originally created as an outgrowth of corporate and university concerns to increase the number of underrepresented ethnic/racial groups who enter and complete the engineering master's degree, today GEM operates programs and conducts activities that address the underrepresentation of ethnic minorities in engineering, science and mathematics from precollege to the doctorate.

Chartered in 1976, GEM is jointly sponsored by 75 university and 83 employer members. It is governed by a Board of Directors comprised of one GEM representative for each university and each employer member. The Board is responsible for policy and serves as the legal representative of the Consortium.

On September 1, 1989, the National Consortium initiated operation of the GEM Center for Graduate Education for Minorities. Through the Center, comprehensive nationwide programs have been established to identify, recruit and enroll minority science and engineering students in graduate programs leading to an advanced degree. The Center serves as the hub and focus for six GEM program components:

1) GEM M.S. Engineering Fellowship Program;
2) GEM Ph.D. Engineering Fellowship Program;
3) GEM Ph.D. Physical/Life Science Fellowship Program;
4) Database Clearinghouse/Research Component;
5) The JOURNEY Project – a guidance counseling series of videotapes to motivate students toward careers in science and engineering; and
6) "Why Graduate School?" – an annual nationwide teleconference designed to provide students with information on making the decision to pursue graduate studies and on selecting, gaining admission, financing and completing a graduate program.

GEM Eastern Regional Office

On July 1, 1992, GEM's Eastern Regional Office opened at the University of Maryland, College Park. Among other activities, the Eastern Regional Office administers the Environmental Protection Agency's Minority Academic Institution (EPA-MAI) Graduate Traineeship Program. The goals of the EPA-MAI Graduate Traineeship Program are to promote graduate education at minority institutions and to increase the number of minority engineers and scientists working on problems associated with environmental degradation.

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